0070966

SAF-RC-012
100-N Ancillary Facilities & 190-DR
Waste Characterization - Other Liquid
FINAL DATA PACKAGE

COMPLETE COPY OF DATA PACKAGE TO:

Dave Encke	X5-50	KW 8/17/06 INITIAL/DATE
Amy Hood	X5-50	KW 8/17/06 INITIAL/DATE
Jeanette Duncan	H9-02	KW 8/17/06 INITIAL/DATE

COMMENTS:

SDG 222S20060582 SAF-RC-012

Rad only Chem only X Rad & Chem

X Complete Partial

Waste Site: 105 N Fission Projects Trap

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SEP 25 2006
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CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
R. A. Bushaw (509) 373-4314	J. H. Kessner, H9-02 (509) 375-4688	06-ATL-111 July 18, 2006

Subject: FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

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July 18, 2006

06-ATL-111

Ms. J. H. Kessner
Environmental Sampling
Washington Closure Hanford
3070 George Washington Way
Richland, Washington 99354

Dear Ms. Kessner:

FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

Enclosed is the final analytical report for sample J12269 collected from the 105 N Fission Products Trap in accordance with SAF number RC-012 on May 18, 2006, and received at the 222-S Laboratory on May 22, 2006.

If you have any questions regarding this report, please call me at 373-4314.

Ruth A Bushaw

Ruth A. Bushaw
Project Coordinator

Enclosure

06-ATL-111

Enclosure

FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

Consisting of 26 pages, including coversheet

06-ATL-111

FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

Ruth A. Bushaw
Advanced Technologies and Laboratories International, Inc.

Date Published
July 2006

Prepared for:

Washington Closure Hanford

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Table of Contents

222-S LABORATORY

FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

1.0 INTRODUCTION

One sample from the 105 N Fission Products Trap was received at the 222-S Laboratory on May 22, 2006. The sample was analyzed in accordance with the special instructions on the chain of custody; Washington Closure Hanford Work Order AT6002 (Work Order); ATL-MP-1011, *ATL Quality Assurance Project Plan for 222-S Laboratory*; and verbal and electronic communication with the customer point of contact.

A Data Summary Report is included as Attachment 1. Attachment 2 contains a table with the analysis date and time for each method. The correlation between the customer sample identification numbers and laboratory identification numbers is presented in the Sample Breakdown Diagrams included as Attachment 3. Results for other detected nonrequested analytes are included in the Opportunistic Analyte Results table in Attachment 4. Copies of the receipt paperwork are included as Attachment 5. Attachment 6 contains the signature page.

The special instructions on the chain of custody form requested that the laboratory initially run only gross alpha/beta and gamma energy analysis (GEA) on all samples. However, verbal direction from the customer point of contact indicated that all analyses listed in the Work Order should proceed on receipt. Following issuance of the preliminary results for gross alpha/beta and GEA, the customer requested that work be stopped on any analyses that had not been completed on the centrifuged liquid sample. Therefore, no results are reported for inductively coupled plasma-mass spectroscopy (ICP-MS), ^{63}Ni, or ^{99}Tc for the centrifuged liquid.

Note that the following changes were made to the Data Summary Report after the preliminary results were provided to the customer point of contact. A "c" qualifier flag was removed from the total alpha result for the centrifuged solid sample because the requirement for meeting the requested relative percent difference (RPD) between sample and duplicate results was not applicable based on the counting uncertainty (Count Err %). Also, results for tracer and carrier recoveries for applicable methods were added to the report.

2.0 SAMPLE APPEARANCE AND HANDLING

One sample (J12269) was collected on May 18, 2006, and was received at the 222-S Laboratory on May 22, 2006. The sample appeared to be a dark brown slurry and was separated by centrifugation prior to analysis, yielding a clear liquid and dark brown solids. Approximately 15 mL of centrifuged liquid and 23.2 g of centrifuged solid were recovered from the centrifugation.

Since the centrifuged liquid was clear, the ICP and radiochemical analyses were performed on direct liquid with only an acid dilution prior to analysis. The centrifuged solid sample was

prepared by acid digestion prior to the inductively coupled plasma (ICP) and ICP-MS analyses and by fusion digestion prior to the radiochemical analyses. The mercury analysis procedure contains digestion as part of the analysis.

3.0 ANALYTICAL RESULTS

The Data Summary Report in Attachment 1 presents the analytical results for the requested analytes. In addition, results for other detected nonrequested analytes are included in Attachment 4 as "opportunistic" analytes. Since these were not requested, the quality of the results was not evaluated and the results are not discussed in this narrative.

Due to a software limitation in the Laboratory Information Management System, the program used to generate reports calculates an RPD for many of the sample and duplicate results, even when one or both of the results is reported less than the detection limit. However, if either the sample or duplicate result is reported less than the detection limit, it is not appropriate to calculate an RPD, and "n/a" should be reported in the "Average" and "RPD %" columns. In addition, the program calculates an average result for the tracer and carrier recoveries and it is not appropriate to perform that calculation.

In Attachments 1 and 4, the column labeled "A#" indicates the aliquot class or the method used for sample preparation before analysis. Samples without a letter identifier in the "A#" column were analyzed directly with no separate preparation analysis or with sample preparation performed as a part of the procedure steps. The aliquot classes are defined as follows:

a. "A" indicates that the solid sample was prepared by an acid digestion prior to ICP and ICP-MS analyses.

b. "F" indicates the solid sample was prepared by a fusion digestion prior to radionuclide analyses.

The "Unit" column indicates the units for the sample results. For the solid samples, the reporting units for the blank do not all match those for the sample results. The units for the blank are µg/mL for the ICP and ICP-MS analyses.

The "Qual Flags" column contains data qualifier flags that are defined as follows:

a. "c" indicates that the RPD did not meet the requirements as discussed in Section 3.2.3.

b. "J" indicates that the reported result should be considered an estimate because of increased uncertainty near the detection limit.

   1. For the ICP, ICP-MS, and mercury analyses, the "J" flag is applied to sample results that are less than 10 times the detection limit.

   2. For radiochemical methods, the "J" flag is applied to sample results when the Count Err % is greater than 30%.

c. "U" indicates that the reported result is less than the calculated detection limit.

3.1 HOLDING TIMES

All applicable holding times were met for this project.

3.2 QUALITY CONTROL RESULTS

3.2.1 Laboratory Control Samples

The accuracy of the analyses was evaluated from the recovery of a laboratory control sample (LCS). For the ICP-MS analysis, only ^{235}U and ^{238}U are available for an LCS. For the isotopic Pu analysis, only $^{239/240}Pu$ is available for the LCS. Other uranium and plutonium isotopes are expected to have the same chemical behavior as these isotopes. Therefore, they are not included in the LCS. For the ^{241}Am and $^{243/244}Cm$ analysis, only ^{241}Am is included in the LCS; and for GEA, ^{60}Co and ^{137}Cs are the only isotopes present in the LCS.

All LCS recoveries were acceptable in accordance with the Work Order and ATL-MP-1011.

3.2.2 Method and Preparation Blanks

For the centrifuged liquid sample, a low activity of ^{90}Sr was detected in the method blank analyzed with the sample. Since the activity was below the detection limit calculated for the sample and below the target quantitation limit (TQL) in the Work Order, no reanalysis was requested.

For the centrifuged solid sample, total beta activity, ^{235}U and ^{238}U were detected in the blanks that were prepared and analyzed with the sample. The levels of contamination were less than 5% of the results reported for the sample and were less than the TQL in the Work Order, so no repreparation or reanalysis was requested.

No other analytes were detected in the method or preparation blanks.

3.2.3 Duplicate Analysis

One duplicate sample was analyzed with each batch. The Work Order requested a precision of <30% RPD between sample and duplicate results. As stated in ATL-MP-1011, the RPD criterion is not applicable if the sample results are less than 10 times the detection limit for inorganic analyses or if the counting uncertainty for radionuclide analyses is >15%. The criterion is also not applicable if the sample results are less than the detection limit. Most of the sample results met these conditions.

For the centrifuged solid sample, the RPD for $^{239/240}Pu$ was 36.4% and failed to meet the criterion. Although the counting uncertainty was <15%, the sample results were only four times the detection limit. A reanalysis was not requested because the results were less than the TQL.

3.2.4 Matrix Spike

One spiked sample was analyzed in each analytical batch for the gross alpha/beta, ICP, ICP-MS, and mercury analyses. For the GEA analysis, there typically is no significant interference from the matrix, so a spiked sample is not analyzed. A tracer is added to all field and quality control samples for the plutonium and americium analyses, and a carrier is added for the ^{90}Sr and ^{63}Ni analyses. The ^{63}Ni carrier is referred to as a tracer in the Data Summary Report. The recovery of the tracer or carrier is used to calculate the reported results. Therefore, a spiked sample is not analyzed for those methods.

The spike recoveries all met the accuracy requirements in the Work Order. The tracer and carrier recoveries all met the method requirements.

3.3 DETECTION LIMITS

The Work Order provided TQLs for all methods except for the isotopic uranium analysis by ICP-MS. The customer point of contact requested a TQL of 0.01 µCi/g.

For the centrifuged liquid sample, the reported detection limits for the radionuclide, ICP, and ICP-MS analyses were less than the requested TQLs. However, due to insufficient sample, the reported detection limit for the mercury analysis was at the TQL.

For the centrifuged solid sample, the reported detection limit for the radionuclide, ICP-MS, and mercury analyses were all less than the requested TQLs. For the ICP metals analysis, all of the reported detection limits were less than the requested TQL except for arsenic, lead, and selenium. For these three analytes, the reported detection limits were much greater than the requested TQLs. The high detection limits were due to a required dilution of the sample based on high concentrations of nonrequested analytes. The result reported for lead was greater than the estimated quantitation limit. Therefore, it typically is not necessary to meet a TQL requirement. Since no arsenic or selenium was detected in the sample, and a less dilute sample could not be analyzed, the customer gave verbal concurrence that a reanalysis was not necessary.

4.0 ANALYTICAL PROCEDURES

Table 1 presents the 222-S Laboratory analytical procedures.

Table 1. Analytical Procedures.

Analysis	Preparation Procedure	Analysis Procedure
Inorganic		
Mercury	Direct – liquid and solid	LA-325-106 Rev. D-1
ICP	Direct – liquid Acid digest - solid	LA-505-161 Rev. F-0
ICP-MS	Acid digest - solid	LA-506-102 Rev. C-0
Radionuclide		
Gross alpha/beta	Direct – liquid Fusion digest - solid	LA-508-101 Rev. J-0
GEA	Direct – liquid Fusion digest - solid	LA-548-121 Rev. G-0
^{90}Sr	Direct – liquid Fusion digest - solid	LA-220-101 Rev. G-0
^{238}Pu and $^{239/240}Pu$	Direct – liquid Fusion digest - solid	LA-953-104 Rev. F-0
^{241}Am and $^{243/244}Cm$	Direct – liquid Fusion digest - solid	LA-953-104 Rev. F-0
^{63}Ni	Fusion digest - solid	LA-285-102 Rev. B-0
^{99}Tc	Fusion digest - solid	LA-438-101 Rev. G-0

Notes:
Acid digest procedure: LA-505-163 Rev. E-0
Fusion digest procedure: LA-549-141 Rev. H-0

5.0 REFERENCES

ATL-MP-1011, 2006, *ATL Quality Assurance Project Plan for 222-S Laboratory*, Revisions 3 and 4, Advanced Technologies and Laboratories International, Inc., Richland, Washington.

Attachment 1

DATA SUMMARY REPORT

Attachment 1
105N FISS PROD TRAP
Data Summary Report

Category: R
Core Number: 222S20060582
Customer Sample ID: J12669
Sample Portion: Centrifuged Liquid

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001050		Total Alpha	uCi/mL	99.7	<1.21E-05	<2.36E-05	<1.79E-05	n/a	27.5	95.6	2.63E-05	500	U
S06M001050		Total Beta	uCi/mL	105	<2.17E-04	1.30E-04	1.46E-04	1.38E-04	11.6	103	4.29E-05	25.8	
S06M001050		Americium 243 Tracer	% Recove	82.000	88.000	36.000	95.000	65.500	n/a	n/a	n/a	n/a	
S06M001050		Americium-241	uCi/mL	99.3	<6.09E-05	<1.47E-04	<5.61E-05	n/a	89.5	n/a	1.47E-04	100	U
S06M001050		Curium-243/244	uCi/mL	n/a	<6.09E-05	<1.47E-04	<5.61E-05	n/a	89.5	n/a	1.47E-04	100	U
S06M001050		Actinium-228	uCi/mL	n/a	<1.42E-04	<1.59E-04	<1.47E-04	n/a	n/a	n/a	1.59E-04	n/a	U
S06M001050		Antimony-125	uCi/mL	n/a	<8.58E-05	<9.04E-05	<8.64E-05	n/a	n/a	n/a	9.04E-05	n/a	U
S06M001050		Cesium-134	uCi/mL	n/a	<3.27E-05	<3.65E-05	<3.43E-05	n/a	n/a	n/a	3.65E-05	n/a	U
S06M001050		Cesium-137	uCi/mL	92.7	<4.29E-05	<3.89E-05	<4.39E-05	n/a	n/a	n/a	3.89E-05	n/a	U
S06M001050		Cobalt-60	uCi/mL	96.6	<3.98E-05	<5.24E-05	5.06E-05	5.15E-05	3.59	n/a	5.24E-05	n/a	U
S06M001050		Europium-152	uCi/mL	n/a	<1.84E-04	<2.06E-04	<1.68E-04	n/a	n/a	n/a	2.06E-04	n/a	U
S06M001050		Europium-154	uCi/mL	n/a	<1.27E-04	<1.21E-04	<1.36E-04	n/a	n/a	n/a	1.21E-04	n/a	U
S06M001050		Europium-155	uCi/mL	n/a	<6.32E-05	<6.51E-05	<6.12E-05	n/a	n/a	n/a	6.51E-05	n/a	U
S06M001050		Radium-226	uCi/mL	n/a	<6.83E-04	<6.96E-04	<6.69E-04	n/a	n/a	n/a	6.96E-04	n/a	U
S06M001050		Mercury	ug/mL	101	<1.00E-04	<0.0200	<0.0200	n/a	0.0	99.2	0.0200	n/a	U
S06M001050		Plutonium 236 Tracer	% Recove	n/a	66.0	78.0	84.0	81.0	n/a	n/a	n/a	n/a	
S06M001050		Plutonium-238	uCi/mL	n/a	<3.92E-05	<5E-07	<3.11E-05	n/a	193	n/a	3.32E-05	100	U
S06M001050		Plutonium-239/240	uCi/mL	102	<3.92E-05	<3.32E-05	<3.11E-05	n/a	6.53	n/a	3.32E-05	100	U
S06M001050		Strontium Carrier	% Recove	79.0	87.0	88.0	86.0	87.0	n/a	n/a	n/a	n/a	
S06M001050		Strontium-89/90	uCi/mL	102	1.48E-04	<1.27E-04	<1.95E-04	n/a	42.2	n/a	2.42E-04	500	U
S06M001050		Arsenic	ug/mL	103	<0.0590	<0.118	<0.118	n/a	0.0	105	0.118	n/a	U
S06M001050		Barium	ug/mL	99.1	<7.00E-03	0.0176	0.0188	0.0182	6.48	101	0.0140	n/a	J
S06M001050		Cadmium	ug/mL	104	<3.00E-03	8.11E-03	7.77E-03	7.94E-03	4.28	105	6.00E-03	n/a	J
S06M001050		Chromium	ug/mL	105	<0.0140	<0.0280	<0.0280	n/a	0.0	106	0.0280	n/a	U
S06M001050		Lead	ug/mL	102	<0.0360	<0.0720	<0.0720	n/a	0.0	105	0.0720	n/a	U
S06M001050		Selenium	ug/mL	107	<0.0640	<0.128	<0.128	n/a	0.0	104	0.128	n/a	U
S06M001050		Silver	ug/mL	101	<4.00E-03	<8.00E-03	<8.00E-03	n/a	0.0	101	8.00E-03	n/a	U

Core Number = Customer Sample Delivery Group

c = RPD did not meet customer requirements
J = Estimated result between MDL and EQL;
or Count Err % > 30%

U = Result < MDL

Attachment 1
105N FISS PROD TRAP
Data Summary Report

Category: R
Core Number: 222S20060582
Customer Sample ID: J12669
Sample Portion: Centrifuged Solid

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001051		Mercury	ug/g	98.0	<0.0500	0.200	0.174	0.187	13.9	99.4	0.0495	n/a	J
S06M001053	F	Americium 243 Tracer	% Recove	44.000	33.000	60.000	61.000	60.500	n/a	n/a	n/a	n/a	
S06M001053	F	Americium-241	uCi/g	99.3	<6.73E-03	<3.91E-03	5.27E-03	4.59E-03	29.6	n/a	3.91E-03	7.32	U
S06M001053	F	Curium-243/244	uCi/g	n/a	<6.73E-03	<3.91E-03	<3.86E-03	n/a	1.29	n/a	3.91E-03	100	U
S06M001053	F	Actinium-228	uCi/g	n/a	<1.25E-03	<7.78E-03	<8.21E-03	n/a	n/a	n/a	7.78E-03	n/a	U
S06M001053	F	Antimony-125	uCi/g	n/a	<7.18E-04	<3.21E-03	<3.36E-03	n/a	n/a	n/a	3.21E-03	n/a	U
S06M001053	F	Cesium-134	uCi/g	n/a	<2.80E-04	<1.27E-03	<1.33E-03	n/a	n/a	n/a	1.27E-03	n/a	U
S06M001053	F	Cesium-137	uCi/g	98.2	<3.46E-04	0.0472	0.0386	0.0429	20.1	n/a	2.04E-03	5.53	
S06M001053	F	Cobalt-60	uCi/g	91.7	<2.96E-04	0.268	0.310	0.289	14.4	n/a	1.36E-03	4.24	
S06M001053	F	Europium-152	uCi/g	n/a	<1.38E-03	<2.39E-03	<2.34E-03	n/a	n/a	n/a	2.39E-03	n/a	U
S06M001053	F	Europium-154	uCi/g	n/a	<1.05E-03	2.49E-03	<2.77E-03	2.63E-03	10.4	n/a	2.09E-03	30.46	J
S06M001053	F	Europium-155	uCi/g	n/a	<5.29E-04	<1.78E-03	<1.84E-03	n/a	n/a	n/a	1.78E-03	n/a	U
S06M001053	F	Radium-226	uCi/g	n/a	<5.79E-03	<0.0189	<0.0191	n/a	n/a	n/a	0.0189	n/a	U
S06M001053	F	Nickel Tracer	% Recove	87.9	89.6	94.1	100	97.1	n/a	n/a	n/a	n/a	
S06M001053	F	Nickel-63	uCi/g	103	<5.62E-04	0.0844	0.0932	0.0888	9.91	n/a	1.06E-03	2	
S06M001053	F	Plutonium 236 Tracer	% Recove	78.0	69.0	109	106	108	n/a	n/a	n/a	n/a	
S06M001053	F	Plutonium-238	uCi/g	n/a	<1.52E-03	<1.17E-03	<1.18E-03	n/a	0.851	n/a	1.17E-03	10.7	U
S06M001053	F	Plutonium-239/240	uCi/g	98.5	<1.52E-03	3.50E-03	5.06E-03	4.28E-03	36.4	n/a	1.17E-03	4.97	c
S06M001053	F	Strontium Carrier	% Recove	87.0	83.0	85.0	85.0	85.0	n/a	n/a	n/a	n/a	
S06M001053	F	Strontium-89/90	uCi/g	95.5	<1.02E-03	0.0469	0.0474	0.0472	1.06	n/a	2.03E-03	7.71	
S06M001053	F	Technetium 99 Tracer	% Recove	60.0	61.0	60.0	61.0	60.5	n/a	n/a	n/a	n/a	
S06M001053	F	Technetium-99	uCi/g	106	<3.54E-03	<3.59E-03	<3.37E-03	n/a	6.32	96.9	3.59E-03	11	U
S06M001053	F	Total Alpha	uCi/g	90.8	<5.84E-04	4.09E-03	8.24E-03	6.16E-03	67.3	71.1	9.25E-04	28.9	
S06M001053	F	Total Beta	uCi/g	89.7	5.04E-03	0.281	0.324	0.302	14.2	88.6	1.43E-03	2.01	
S06M001054	A	Arsenic	ug/g	109	<0.0590	<29.4	<29.3	n/a	0.178	102	29.4	n/a	U
S06M001054	A	Barium	ug/g	100	<7.00E-03	96.3	102	99.0	5.60	105	3.49	n/a	
S06M001054	A	Cadmium	ug/g	99.3	<3.00E-03	11.2	11.0	11.1	2.13	101	1.49	n/a	J
S06M001054	A	Chromium	ug/g	101	<0.0140	56.7	65.0	60.9	13.6	103	6.97	n/a	J
S06M001054	A	Lead	ug/g	97.7	<0.0360	288	289	289	0.408	96.3	17.9	n/a	

Core Number = Customer Sample Delivery Group

c = RPD did not meet customer requirements
J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

06-ATL-111

Attachment 1
105N FISS PROD TRAP
Data Summary Report

Category: R
Core Number: 222S20060582
Customer Sample ID: J12669
Sample Portion: Centrifuged Solid

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001054	A	Selenium	ug/g	99.0	<0.0640	<31.9	<31.8	n/a	0.179	108	31.9	n/a	U
S06M001054	A	Silver	ug/g	95.6	<4.00E-03	<1.99	<1.99	n/a	0.178	101	1.99	n/a	U
S06M001054	A	Uranium-233	ug/g	n/a	<1.00E-07	<1.99E-03	<1.99E-03	n/a	0.178	n/a	1.99E-03	n/a	U
S06M001054	A	Uranium-234	ug/g	n/a	<5.00E-08	6.42E-03	6.39E-03	6.41E-03	0.489	n/a	9.96E-04	n/a	J
S06M001054	A	Uranium-235	ug/g	n/a	7.72E-07	0.830	0.837	0.834	0.835	98.5	2.19E-03	n/a	
S06M001054	A	Uranium-236	ug/g	n/a	<4.00E-08	0.0466	0.0476	0.0471	2.04	n/a	7.97E-04	n/a	
S06M001054	A	Uranium-238	ug/g	103	9.12E-05	82.6	83.6	83.1	1.26	103	0.110	n/a	

06-ATL-111

Core Number = Customer Sample Delivery Group

c = RPD did not meet customer requirements
J = Estimated result between MDL and EQL;
or Count Err % > 30%

U = Result < MDL

Attachment 2

ANALYSIS DATE AND TIME REPORT

Attachment 2. Analysis Date and Time

Customer ID	Sample Portion	Sample #	Method	Analysis Date/Time	Preparation Date
J12669	Solid	S06M001049	CENTRIFUGE	5/23/2006 14:19	
J12669	Centrifuged Liquid	S06M001050	ALPHA/BETA	5/30/2006 10:30	
J12669	Centrifuged Liquid	S06M001050	AMERICIUM	6/7/2006 9:20	
J12669	Centrifuged Liquid	S06M001050	GEA	5/26/2006 18:58	
J12669	Centrifuged Liquid	S06M001050	HG	6/8/2006 10:55	
J12669	Centrifuged Liquid	S06M001050	ICP-RCRA METALS	6/6/2006 10:15	
J12669	Centrifuged Liquid	S06M001050	PLUTONIUM	6/6/2006 14:30	
J12669	Centrifuged Liquid	S06M001050	STRONTIUM-90	5/31/2006 15:25	
J12669	Centrifuged Solid	S06M001051	HG	6/13/2006 8:10	
J12669	Centrifuged Solid	S06M001053	ALPHA/BETA	6/5/2006 10:50	5/26/2006
J12669	Centrifuged Solid	S06M001053	AMERICIUM	6/7/2006 9:30	5/26/2006
J12669	Centrifuged Solid	S06M001053	GEA	5/30/2006 18:22	5/26/2006
J12669	Centrifuged Solid	S06M001053	NICKEL-63	6/9/2006 10:20	5/26/2006
J12669	Centrifuged Solid	S06M001053	PLUTONIUM	6/6/2006 14:40	5/26/2006
J12669	Centrifuged Solid	S06M001053	STRONTIUM-90	5/31/2006 15:25	5/26/2006
J12669	Centrifuged Solid	S06M001053	TC-99	6/9/2006 10:05	5/26/2006
J12669	Centrifuged Solid	S06M001054	ICP-RCRA METALS	6/7/2006 15:06	6/6/2006
J12669	Centrifuged Solid	S06M001054	MS URANIUM	6/9/2006 13:44	6/6/2006

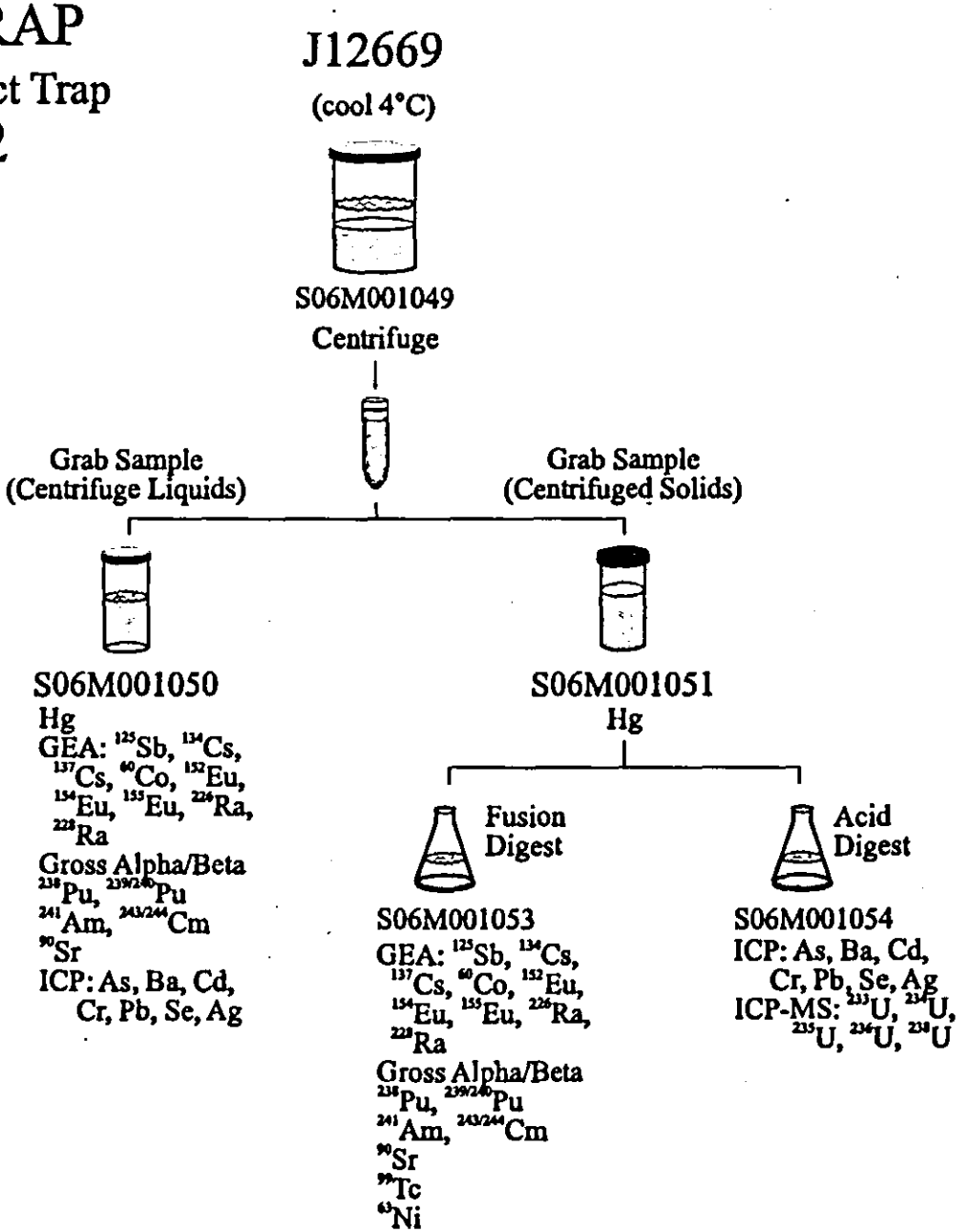
Attachment 3

SAMPLE BREAKDOWN DIAGRAMS

105N FISS PROD TRAP

105N Reactor Fission Product Trap

Group 222S20060582



Attachment 4

OPPORTUNISTIC ANALYTE RESULTS

Attachment 4
105N FISS PROD TRAP
Opportunistic Analyte Results

Category: O

Core Number: 222S20060582

Customer Sample ID: J12669

Sample Portion: Centrifuged Liquid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001050			Aluminium	ug/mL	101	<0.0270	0.180	0.199	0.189	10.2	102	0.0540	n/a	J
S06M001050			Bismuth	ug/mL	99.4	<0.102	0.211	<0.204	0.208	3.50	n/a	0.204	n/a	J
S06M001050			Boron	ug/mL	102	<0.0180	1.27	1.28	1.28	1.41	106	0.0360	n/a	
S06M001050			Calcium	ug/mL	109	<0.0800	15.6	15.4	15.5	0.983	104	0.160	n/a	
S06M001050			Europium	ug/mL	97.5	<1.00E-03	4.52E-03	<2.00E-03	3.26E-03	77.3	n/a	2.00E-03	n/a	J
S06M001050			Iron	ug/mL	103	<0.0130	2.79	2.82	2.80	1.22	102	0.0260	n/a	
S06M001050			Magnesium	ug/mL	100	<0.0150	0.529	0.503	0.516	5.11	97.3	0.0300	n/a	
S06M001050			Manganese	ug/mL	103	<7.00E-03	0.0155	0.0158	0.0157	1.98	103	0.0140	n/a	J
S06M001050			Phosphorus	ug/mL	103	<0.0430	0.690	0.694	0.692	0.603	107	0.0860	n/a	J
S06M001050			Potassium	ug/mL	99.1	<0.295	20.3	19.9	20.1	1.80	122	0.590	n/a	
S06M001050			Silicon	ug/mL	104	<0.0460	5.52	5.52	5.52	0.0101	107	0.0920	n/a	
S06M001050			Sodium	ug/mL	101	<0.0420	83.9	85.3	84.6	1.60	n/a	0.0840	n/a	
S06M001050			Strontium	ug/mL	102	<7.00E-03	0.123	0.125	0.124	1.73	104	0.0140	n/a	J
S06M001050			Sulfur	ug/mL	101	<0.0580	6.09	6.08	6.08	0.175	98.6	0.116	n/a	
S06M001050			Titanium	ug/mL	103	<2.00E-03	0.0190	0.0171	0.0181	10.6	104	4.00E-03	n/a	J
S06M001050			Uranium	ug/mL	93.3	<0.0310	0.432	0.433	0.433	0.356	103	0.0620	n/a	J
S06M001050			Zinc	ug/mL	103	<4.00E-03	0.116	0.128	0.122	10.1	104	8.00E-03	n/a	

Sample Portion: Centrifuged Solid

Sample#	R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001053		F	Americium-241	uCi/g	n/a	<4.22E-04	2.72E-03	4.33E-03	3.53E-03	45.8	n/a	1.22E-03	28.71	
S06M001054		A	Aluminium	ug/g	105	<0.0270	6.68E+03	7.02E+03	6.85E+03	4.95	n/a	13.5	n/a	
S06M001054		A	Beryllium	ug/g	110	<1.20E-03	0.895	1.15	1.02	25.0	102	0.598	n/a	J
S06M001054		A	Calcium	ug/g	118	<0.0800	1.04E+04	1.03E+04	1.04E+04	0.957	n/a	39.9	n/a	
S06M001054		A	Cerium	ug/g	100	<0.0150	7.52	9.25	8.38	20.7	98.8	7.47	n/a	J
S06M001054		A	Cobalt	ug/g	100	<8.00E-03	22.3	22.3	22.3	0.115	102	3.99	n/a	J
S06M001054		A	Copper	ug/g	99.7	<0.0140	81.0	82.4	81.7	1.65	101	6.97	n/a	
S06M001054		A	Europium	ug/g	95.7	<1.00E-03	10.3	11.9	11.1	14.5	92.7	0.498	n/a	
S06M001054		A	Iron	ug/g	99.9	<0.0130	3.90E+04	4.42E+04	4.16E+04	12.6	n/a	6.48	n/a	

Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

Attachment 4
105N FISS PROD TRAP
Opportunistic Analyte Results

Category: O
Core Number: 222S20060582
Customer Sample ID: J12669
Sample Portion: Centrifuged Solid

Sample# R	A#	Analyte	Unit	Standard %	Blank	Result	Duplicate	Average	RPD %	Spk Rec %	Det Limit	Count Err %	Qual Flags
S06M001054	A	Lanthanum	ug/g	99.3	<8.00E-03	5.40	7.20	6.30	28.5	97.9	3.99	n/a	J
S06M001054	A	Lithium	ug/g	99.9	<9.00E-03	5.28	5.34	5.31	1.08	96.7	4.48	n/a	J
S06M001054	A	Magnesium	ug/g	95.0	<0.0150	3.23E+03	3.19E+03	3.21E+03	1.33	n/a	7.47	n/a	
S06M001054	A	Manganese	ug/g	99.7	<7.00E-03	368	390	379	5.72	113	3.49	n/a	
S06M001054	A	Neodymium	ug/g	98.2	<8.00E-03	6.39	7.55	6.97	16.7	96.0	3.99	n/a	J
S06M001054	A	Nickel	ug/g	100	<0.0220	141	158	150	11.9	104	11.0	n/a	
S06M001054	A	Phosphorus	ug/g	102	<0.0430	4.01E+03	3.93E+03	3.97E+03	2.00	96.2	21.4	n/a	
S06M001054	A	Potassium	ug/g	94.2	<0.295	9.93E+02	1.00E+03	9.98E+02	1.15	n/a	147	n/a	J
S06M001054	A	Silicon	ug/g	n/a	<0.0460	7.98E+02	1.11E+03	9.54E+02	32.6	100	22.9	n/a	
S06M001054	A	Sodium	ug/g	99.8	<0.0420	341	359	350	5.09	n/a	20.9	n/a	
S06M001054	A	Strontium	ug/g	101	<7.00E-03	73.1	75.0	74.1	2.56	103	3.49	n/a	
S06M001054	A	Sulfur	ug/g	95.2	<0.0580	65.0	75.8	70.4	15.4	102	28.9	n/a	J
S06M001054	A	Thallium	ug/g	n/a	<0.0560	114	130	122	13.3	n/a	27.9	n/a	J
S06M001054	A	Thorium	ug/g	91.0	<9.00E-03	11.2	16.3	13.8	37.1	92.6	4.48	n/a	J
S06M001054	A	Titanium	ug/g	101	<2.00E-03	630	775	703	20.6	n/a	0.996	n/a	
S06M001054	A	Uranium	ug/g	95.4	<0.0310	138	139	138	0.130	89.5	15.4	n/a	J
S06M001054	A	Vanadium	ug/g	102	<6.00E-03	26.4	34.3	30.4	26.1	102	2.99	n/a	J
S06M001054	A	Zinc	ug/g	95.3	<4.00E-03	1.40E+03	1.44E+03	1.42E+03	3.01	n/a	1.99	n/a	
S06M001054	A	Zirconium	ug/g	94.3	<2.00E-03	11.3	9.36	10.3	19.0	n/a	0.996	n/a	

Core Number = Customer Sample Delivery Group

J = Estimated result between MDL and EQL; or Count Err % > 30%

U = Result < MDL

Attachment 5

SAMPLE RECEIPT PAPERWORK

Washington Closure Hanford	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST		RC-012-007	Page 1 of 1
Collector Amy Hood	Company Contact Dave Encke	Telephone No. 373-9733	Project Coordinator KESSNER, JH	Price Code Data Turnaround 45 Days
Project Designation 100-N Ancillary Facilities & 190-DR Waste Characterization	Sampling Location 105 N Fission Projects Trap		SAF No. RC-012	Air Quality ☐ Work order A7G02
Ice Chest No. Viking Type A Package	Field Logbook No. EL-1516-10	COA R105NH2000	Method of Shipment Hand Delivery Govt Vehicl	
Shipped To 222-S Lab Operations	Offsite Property No. RSR No. 185719		Bill of Lading/Air Bill No. See RSR	

POSSIBLE SAMPLE HAZARDS/REMARKS

RAD DOT TYPE A

Note: OUTSIDE OF SAMPLE BOTTLE MAY BE CONTAMINATED

Special Handling and/or Storage

None

Preservation	None										
Type of Container	GP										
No. of Container(s)	1										
Volume	60mL										
See item (1) in Special Instructions											

SAMPLE ANALYSIS

Sample Group
2225200605B2

Sample No.	Matrix *	Sample Date	Sample Time								
J12669	OTHER LIQUID	5/18/04	1058	X							
S06M001049											

CHAIN OF POSSESSION	Sign/Print Names		
Relinquished By/Removed From A. Hood 105N	Date/Time 5/18/04 1118	Received By/Stored In HRA Hatch 105N	Date/Time 5/18/04 1118
Relinquished By/Removed From 105N	Date/Time 5/22/04 1000	Received By/Stored In 105N Rad Room Cart	Date/Time 5/22/04 1000
Relinquished By/Removed From 105N Rad Room Cart	Date/Time 5/22/04 1149	Received By/Stored In A. Hood	Date/Time 5/22/04 1149
Relinquished By/Removed From A. Hood	Date/Time 5/22/04 1152	Received By/Stored In [illegible]	Date/Time 5/24/04 1152
Relinquished By/Removed From [illegible]	Date/Time 5-22-04 1355	Received By/Stored In [illegible]	Date/Time 5-22-04 1355
Relinquished By/Removed From	Date/Time	Received By/Stored In	Date/Time

SPECIAL INSTRUCTIONS

Lab to run GEA/GA/GB initially, then contact Rich Weiss (372-9631) or Joan Kessner (375-4688).

(1) Gamma Spectroscopy; Gross Alpha; Gross Beta; Isotopic Plutonium; Isotopic Uranium; Americium-241/Curium-244; Strontium-89,90 -- Sr-90; Technetium-99; Nickel-63, ICP Metals - 6010A (Add-on); Mercury - 7471 - (CV)

SEE HAZARDS ABOVE

Matrix *
S=Soil
SE=Sediment
SO=Solid
SI=Sludge
W = Water
O=Oil
A=Air
DS=Drum Solids
DL=Drum Liquids
T=Tissue
WI=Wipe
L=Liquid
V=Vegetation
X=Other

LABORATORY SECTION	Received By	Title	Date/Time
FINAL SAMPLE DISPOSITION	Disposal Method	Disposed By	Date/Time

BHI-EE-011 (08/29/2005)

18

06-ATL-111

RADIOACTIVE SHIPMENT RECORD

185719 3.

Page 1 of 1

1. SHIP FROM U.S. DEPT. OF ENERGY C/O
Company: Washington Closure Hanford
Address: 105-N Building, 100-N Area
City, State, Zip: Richland, WA 99352
Contact: David St. John
Phone: 509-372-9144

Ship: [X] Prepaid [ ] Collect — 4.
Via: [X] Motor (Government) [ ] Air Psgr [ ] UPS [ ] Rail [ ] Air Cargo [ ] Site Carrier
SHIPMENT AUTHORIZATION NUMBER:

2. SHIP TO
Company: Advanced Technology Labs
Address: 222-S Laboratory, 200-West
City, State, Zip: Richland, WA 99352
Attention: Ruth Buskirk
Phone: ~~509-372-9144~~ 373-4314

Markings Applied 6.
- Radioactive - LSA [ ]
- Radioactive - SCO [ ]
- Type A [X]
- Type B with trefoil [ ]

LSA Description 8.
- LSA-I [X]
- LSA-II [ ]
- LSA-III [ ]
- SCO-I [ ]
- SCO-II [ ]

Labels Applied 10.
- Empty [ ]
- Radioactive White - I [X]
- Radioactive Yellow - II [ ]
- Radioactive Yellow - III [ ]
- Subsidiary Hazard [ ]

For Normal Form only — 7.
Identify
Physical Form: [X] Liquid [ ] Gas [ ] Solid
Chemical Form: [X] Elemental [ ] Metal [ ] Nitrate [ ] Oxide [ ] Mixture [ ] Other

EMERGENCY RESPONSE 9.
Telephone: 509-373-3800
Emergency Response Guide(s): 163

Highway Route Controlled Quantity [ ]
Exclusive Use Shipment with instructions [ ]
Placards Applied [ ]
If Rail Specify:
Fissile Excepted, Grams: < 25 gms [X]
Excepted Package Statement [ ]

5. HM Proper Shipping Name: _____ Radioactive Material,

[ ]	excepted package - empty packaging	7	UN2910
[ ]	excepted package - instruments or articles	7	UN2910
[ ]	excepted package - limited quantity of material	7	UN2910
[ ]	excepted package - articles manufactured from natural or depleted uranium or natural thorium	7	UN2910
[ ]	Special Form, n.o.s.	7	UN2974
[ ]	Low Specific Activity, n.o.s.	7	UN2912
[ ]	n.o.s.	7	UN2982
[ ]	Fissile, n.o.s.	7	UN2918
[ ]	Surface Contaminated Object	7	UN2913
[X]	Type A Package, non-special form, fissile excepted	7	UN2915

Warning – Fissile Material Controlled Shipment. Do Not Load More Than N/A Packages Per Vehicle. In Loading and Storage Areas, Keep at Least 20 Feet From Other Packages Bearing Radioactive Labels.

11.	No. Pkg.	Model Package	COC/Spec	Serial No.	Seal No.	Isotopes	T.I.	Bq/Package (MBq)	Gr. Wt. Kg.
	1	Viking 004C	TYPE A	04008	Tape	Pu-239, Am-241, Pu-238	0.0	2.384	30
	SAE AC-012					Co-60, Cs-137, Sr-90			
	Sample bottle inside double poly bags enclosed in Viking						Type A Container		
	per Manufacturers packing instructions					1-60 ml bottle	total vol 60 mls.		
(Shipper may describe package in detail on one of the unused lines above) Sample JT2669						TOTALS	0.0	2.384	30 kg

12. This is to certify that the above named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.
Certifier's Signature: David St. John — On behalf of DOE-RL — Date: 5/22/06 — Organization: WCH-4F5 — Complete Cost Code (Inc. End Function): R105NH 2000

13.
Surface Dose Rate of Package: [X] <0.005 or _____ mSv/hr; <0.5 or _____ mrem/hr (N+β γ)
Dose Rate @ 1 Meter from Surface of Package: [X] <0.005 or _____ mSv/hr; <0.5 or _____ mrem/hr (N+β γ)
Smears of Outer Container: [ ] <0.41 Bq (22 dpm) β γ/cm² [ ] <0.04 Bq (2.2 dpm) α/cm² [X] <Tbl. 2-2 HSRCM Onsite Limits
TRUCK LOAD OR EXCLUSIVE USE: Surface [X] <2 mSv/hr (200 mrem/hr); @ 2 meters [X] <0.1 mSv/hr (10 mrem/hr); @ Cab or sleeper [X] <0.02 mSv/hr (2 mrem/hr) (Using N+β γ)
Additional Data and Instructions (inc. Readings on Internal Packaging): outside container may contain. fixed
Signature - Radiation Monitoring: [signature] — Bldg.: 105N — Survey No.: 100SMT-06-0230 — Date: 5/22/06

14. TRANSPORTER: Vehicle Number: GH4928A; DRIVER SIGNATURE: David St. John
RECEIVER: RECEIVER SIGNATURE: [signature]; Date: 5/22/06

15. OFFSITE AUTHORIZATION
Shipment has been inspected and verified to be in compliance with DOT regulations
Authorized Signature: N/A — Printed Name: — Date:

16. AUTHORIZATION FOR SHIPMENT
AIR TRANSPORT CERTIFICATION: [X] N/A
CARGO AIRCRAFT: [ ] Cargo Aircraft Only Labels Applied
PASSENGER AIRCRAFT: [ ] Ltd Qty [ ] <3 T.I. [ ] Research/Medical Diagnosis [ ] Human Medical Research
Pkg. Dimensions (cm):

17. OFFSITE AUTHORIZATION

Tracking No.	Date Shipped	Routing	ETA
N/A			
Surveyed By	**Date**	**Approved for Shipment Offsite**	**Date**

54-6000-088 (06/97)

GENERATOR KNOWLEDGE INFORMATION

AT6002

1. Chain of Custody Number RC-012-007 CACN/COA R105NH2000 Customer Identification Number ~~AT6002~~

2. List generator knowledge or description of process that produced sample. Or list description of sample source:

MSDS Available? ☒ No ○ Yes Hanford MSDS No. NA

3. List all waste codes and constituents associated with the waste or media that was sampled, regardless of CERCLA status.

a) Does the sample contain any of the following listed waste codes?

By checking "unknown" the customer understands that no knowledge is available following a careful search.

	List Federal Waste Code(s):	List Constituent(s):			
P Codes:			○ Yes	○ No	☒ Unknown
U Codes:			○ Yes	○ No	☒ Unknown
K Codes:			○ Yes	○ No	☒ Unknown
F Codes:			○ Yes	○ No	☒ Unknown

b) List applicable characteristic waste codes, flash point, pH, constituents, and concentrations as appropriate.

D001:	☐ FP <100°F	☐ FP ≥100 <140°F	☐ DOT Oxidizer	○ Yes ○ No	☒ Unknown
D002:	☐ pH ≤2	☐ pH ≥12.5	☐ Solid Corrosive (WSC2)	○ Yes ○ No	☒ Unknown
D003:	☐ Cyanide	☐ Sulfide	☐ Water Reactive ☐ Other _____ (i.e., peroxide former, explosive, air reactive)	○ Yes ○ No	☒ Unknown
D004-D043 (Identify applicable waste codes and concentrations):				○ Yes ○ No	☒ Unknown

c) If characteristic, list any known underlying hazardous constituents (UHCs) reasonably expected to be present, and their concentrations that may be present above the LDR treatment standard (40 CFR 268.48):

Unknown

d) List any known Land Disposal Restrictions (LDR) subcategories, if applicable (40 CFR 268.40):

Unknown

e) List any applicable Washington State dangerous waste codes: (not required if federally regulated)

WT01:	○ Yes	○ No	☒ Unknown	WP01:	○ Yes	○ No	☒ Unknown
WT02:	○ Yes	○ No	☒ Unknown	WP02:	○ Yes	○ No	☒ Unknown
W001:	○ Yes	○ No	☒ Unknown	WP03:	○ Yes	○ No	☒ Unknown
List constituents and concentrations:				F003:*	○ Yes	○ No	☒ Unknown

(*State mixture rule for ignitability)

4. Is this material TSCA regulated for PCBs? ○ Yes ○ No ☒ Unknown ○ Analysis Requested

List concentration if applicable: NA Centrifugation may be performed prior to PCB screen

If yes, what is the source of the PCBs? (see TSCA PCB Hanford Site User Guide, DOE/RL-2001-50) on solids and waste designated as "Suspect" PCB. per telecon w/L.E. Bonnaman 5/23/06 Initials

☐ PCB Liquid Waste	☐ PCB Bulk Product Waste	☐ PCB Transformer ≥500 ppm	☒ Unknown
☐ PCB Remediation Waste	☐ PCB R&D Waste	☐ PCB contaminated electrical equipment (capacitor/ballast) <500 ppm	
☐ PCB Spill Material	☐ PCB Item	☐ Other PCB Waste (list) NA	

5. Is this material TRU? ○ Yes ○ No ☒ Unknown

6. ACCURACY OF INFORMATION

Based on my inquiry of those individuals immediately responsible for obtaining this information, that to the best of my knowledge, the information entered in this document is true, accurate, and complete.

Print & Sign DB Encke / DB Encke Date 5/22/06

A-6002-990 (08/03)

222-S Laboratory
Sample Receipt and Chain of Custody Checklist

COC #: RC-012-007 Date Samples Received: 5-22-06

Project #: 105N Fission Number of Samples: 1

Sample Custodian: Roger Chambers Date: 5-22-06

Action	Complete & Ok?	N/A	Comments
Obtain a copy of shipping document	✓		
Verify RSA is complete		✓	
Verify GKI is complete	✓		
Check that outer custody seal is intact, if present	✓		
Record cooler temperature, as appropriate		✓	
Samples are intact & in good condition	✓		If no, provide comments on back
Verify COC is accurate & complete, containing the following information:	✓		
• Client name & client sample number	✓		
• Date & time of sampling	✓		
• Sampling location or origin	✓		
• Container type, size, and number	✓		
• Sample preservation, as appropriate		✓	
• Analysis request is clear	✓		
• Signature of persons relinquishing & receiving samples	✓		
• Date & time of sample custody exchange	✓		
Verify that sample numbers on containers match the COC and/or RSA		✓	
Verify sample receipt date is at least 24 hrs prior to expiration of holding time		✓	
Property store samples	✓		
Notify the responsible chemist for very short holding times		✓	

Notify the PC immediately if any problems are noted.

Samples acceptable for release? Yes PC Initials: EAB Date: 5/22/06

If no, comment on communication & resolution:

4/27/06 Version

Attachment 6

SIGNATURE PAGE

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
R. A. Bushaw (509) 373-4314	J. H. Kessner, H9-02 (509) 375-4688	06-ATL-111 July 18, 2006

Subject: FINAL REPORT FOR THE 105 N FISSION PRODUCTS TRAP SAMPLE RECEIVED IN MAY 2006 – SAMPLE GROUP 222S20060582

DISTRIBUTION

Approval	Date	Name	MSIN	Attach
		ATL Correspondence Control	R1-27	H
		Advanced Technologies and Laboratories International, Inc.		
HLA	7-18-06	H. L. Anastos	T6-10	X
RABushaw	7-18-06	R. A. Bushaw	T6-10	X
		J. G. Hwang	T6-10	X
		W. L. Robbins	TS-10	C
		ATL Correspondence File	T6-10	H
		Project Files	T6-10	H

Notes: C = Cover Letter only
H = Hardcopy
X = Copy from Records Management Information System